

68. [New] A method for increasing energy reserves in the skin of a subject, comprising administering to said subject an effective amount of creatine, creatine phosphate, creatine compound or a salt thereof, such that the energy reserves in the skin of said subject is increased.

69. [New] A method for sustaining energy production in the skin of a subject, comprising administering to said subject an effective amount of creatine, creatine phosphate, creatine compound or a salt thereof, such that energy production the skin of said subject is sustained.

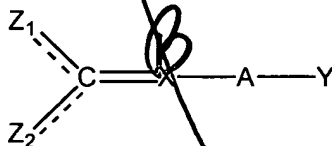
70. [New] A method for modulating energy flow in the skin of a subject, comprising administering to said subject an effective amount of creatine, creatine phosphate, creatine compound or a salt thereof, such that the energy flow in the skin of said subject is modulated.

71. [New] The method of any one of claims 68-70, wherein creatine is administered to said subject.

72. [New] The method of claim 71, wherein said creatine is creatine monohydrate.

73. [New] The method of claim 71, wherein said creatine is creatine citrate.

74. [New] The method of any one of claims 68-70, wherein said creatine compound is of the general formula:



and pharmaceutically acceptable salts thereof, wherein:

a) Y is selected from the group consisting of:  $-CO_2H$ ,  $-NHOH$ ,  $-NO_2$ ,  $-SO_3H$ ,  $-C(=O)NHSO_2J$  and  $-P(=O)(OH)(OJ)$ , wherein J is selected from the group consisting of: hydrogen,  $C_1$ - $C_6$  straight chain alkyl,  $C_3$ - $C_6$  branched alkyl,  $C_2$ - $C_6$  alkenyl,  $C_3$ - $C_6$  branched alkenyl, and aryl;

b) A is selected from the group consisting of: C, CH, C<sub>1</sub>-C<sub>5</sub>alkyl, C<sub>2</sub>-C<sub>5</sub>alkenyl, C<sub>2</sub>-C<sub>5</sub>alkynyl, and C<sub>1</sub>-C<sub>5</sub> alkoyl chain, each having 0-2 substituents which are selected independently from the group consisting of:

1) K, where K is selected from the group consisting of: C<sub>1</sub>-C<sub>6</sub> straight alkyl, C<sub>2</sub>-C<sub>6</sub> straight alkenyl, C<sub>1</sub>-C<sub>6</sub> straight alkoyl, C<sub>3</sub>-C<sub>6</sub> branched alkyl, C<sub>3</sub>-C<sub>6</sub> branched alkenyl, and C<sub>4</sub>-C<sub>6</sub> branched alkoyl, K having 0-2 substituents independently selected from the group consisting of: bromo, chloro, epoxy and acetoxy;

2) an aryl group selected from the group consisting of: a 1-2 ring carbocycle and a 1-2 ring heterocycle, wherein the aryl group contains 0-2 substituents independently selected from the group consisting of: -CH<sub>2</sub>L and -COCH<sub>2</sub>L where L is independently selected from the group consisting of: bromo, chloro, epoxy and acetoxy; and

3) -NH-M, wherein M is selected from the group consisting of: hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>2</sub>-C<sub>4</sub> alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoyl, C<sub>3</sub>-C<sub>4</sub> branched alkyl, C<sub>3</sub>-C<sub>4</sub> branched alkenyl, and C<sub>4</sub> branched alkoyl.

c) X is selected from the group consisting of NR<sub>1</sub>, CHR<sub>1</sub>, CR<sub>1</sub>, O and S, wherein R<sub>1</sub> is selected from the group consisting of:

1) hydrogen;

2) K where K is selected from the group consisting of: C<sub>1</sub>-C<sub>6</sub> straight alkyl, C<sub>2</sub>-C<sub>6</sub> straight alkenyl, C<sub>1</sub>-C<sub>6</sub> straight alkoyl, C<sub>3</sub>-C<sub>6</sub> branched alkyl, C<sub>3</sub>-C<sub>6</sub> branched alkenyl, and C<sub>4</sub>-C<sub>6</sub> branched alkoyl, K having 0-2 substituents independently selected from the group consisting of: bromo, chloro, epoxy and acetoxy;

3) an aryl group selected from the group consisting of a 1-2 ring carbocycle and a 1-2 ring heterocycle, wherein the aryl group contains 0-2 substituents independently selected from the group consisting of: -CH<sub>2</sub>L and -COCH<sub>2</sub>L where L is independently selected from the group consisting of: bromo, chloro, epoxy and acetoxy;

4) a C<sub>5</sub>-C<sub>9</sub> α-amino-ω-methyl-ω-adenosylcarboxylic acid attached via the ω-methyl carbon;

5) a C<sub>5</sub>-C<sub>9</sub> α-amino-ω-aza-ω-methyl-ω-adenosylcarboxylic acid attached via the ω-methyl carbon; and

6) a C<sub>5</sub>-C<sub>9</sub> α-amino-ω-thia-ω-methyl-ω-adenosylcarboxylic acid attached via the ω-methyl carbon;

d) Z<sub>1</sub> and Z<sub>2</sub> are chosen independently from the group consisting of: =O, -NHR<sub>2</sub>, -CH<sub>2</sub>R<sub>2</sub>, -NR<sub>2</sub>OH; wherein Z<sub>1</sub> and Z<sub>2</sub> may not both be =O and wherein R<sub>2</sub> is selected from the group consisting of:

1) hydrogen;

2) K, where K is selected from the group consisting of: C<sub>1</sub>-C<sub>6</sub> straight alkyl; C<sub>2</sub>-C<sub>6</sub> straight alkenyl, C<sub>1</sub>-C<sub>6</sub> straight alkoyl, C<sub>3</sub>-C<sub>6</sub> branched alkyl, C<sub>3</sub>-C<sub>6</sub> branched alkenyl, and C<sub>4</sub>-C<sub>6</sub> branched alkoyl, K having 0-2 substituents independently selected from the group consisting of: bromo, chloro, epoxy and acetoxy;

3) an aryl group selected from the group consisting of a 1-2 ring carbocycle and a 1-2 ring heterocycle, wherein the aryl group contains 0-2 substituents independently selected from the group consisting of: -CH<sub>2</sub>L and -COCH<sub>2</sub>L where L is independently selected from the group consisting of: bromo, chloro, epoxy and acetoxy;

4) a C<sub>4</sub>-C<sub>8</sub> α-amino-carboxylic acid attached via the ω-carbon;

5) B, wherein B is selected from the group consisting of: -CO<sub>2</sub>H, -NHOH, -SO<sub>3</sub>H, -NO<sub>2</sub>, OP(=O)(OH)(OJ) and -P(=O)(OH)(OJ), wherein J is selected from the group consisting of: hydrogen, C<sub>1</sub>-C<sub>6</sub> straight alkyl, C<sub>3</sub>-C<sub>6</sub> branched alkyl, C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>3</sub>-C<sub>6</sub> branched alkenyl, and aryl, wherein B is optionally connected to the nitrogen via a linker selected from the group consisting of: C<sub>1</sub>-C<sub>2</sub> alkyl, C<sub>2</sub> alkenyl, and C<sub>1</sub>-C<sub>2</sub> alkoyl;

6) -D-E, wherein D is selected from the group consisting of: C<sub>1</sub>-C<sub>3</sub> straight alkyl, C<sub>3</sub> branched alkyl, C<sub>2</sub>-C<sub>3</sub> straight alkenyl, C<sub>3</sub> branched alkenyl, C<sub>1</sub>-C<sub>3</sub> straight alkoyl, aryl and aroyl; and E is selected from the group consisting of: - (PO<sub>3</sub>)<sub>n</sub>NMP, where n is 0-2 and NMP is ribonucleotide monophosphate connected via the 5'-phosphate, 3'-phosphate or the aromatic ring of the base; -[P(=O)(OCH<sub>3</sub>)(O)]<sub>m</sub>-Q, where m is 0-3 and Q is a ribonucleoside connected via the ribose or the aromatic ring of the base; -[P(=O)(OH)(CH<sub>2</sub>)]<sub>m</sub>-Q, where m is 0-3 and Q is a ribonucleoside connected via the ribose or the aromatic ring of the base; and an aryl group containing 0-3 substituents chosen independently from the group consisting of: Cl, Br, epoxy, acetoxy, -OG, -C(=O)G, and -CO<sub>2</sub>G, where G is independently selected from the group consisting of: C<sub>1</sub>-C<sub>6</sub> straight alkyl, C<sub>2</sub>-C<sub>6</sub> straight alkenyl, C<sub>1</sub>-C<sub>6</sub> straight alkoyl, C<sub>3</sub>-C<sub>6</sub> branched alkyl, C<sub>3</sub>-C<sub>6</sub> branched alkenyl, C<sub>4</sub>-C<sub>6</sub> branched alkoyl, wherein E may be attached to any point to D, and if D is alkyl or alkenyl, D may be connected at either or both ends by an amide linkage; and

7) -E, wherein E is selected from the group consisting of - (PO<sub>3</sub>)<sub>n</sub>NMP, where n is 0-2 and NMP is a ribonucleotide monophosphate connected via the 5'-phosphate, 3'-phosphate or the aromatic ring of the base; -[P(=O)(OCH<sub>3</sub>)(O)]<sub>m</sub>-Q, where m is 0-3 and Q is a ribonucleoside connected via the ribose or the aromatic ring of the base; -[P(=O)(OH)(CH<sub>2</sub>)]<sub>m</sub>-Q, where m is 0-3 and Q is a ribonucleoside connected via the ribose or the aromatic ring of the base; and an aryl group containing 0-3 substituents chosen independently from the group consisting of: Cl, Br, epoxy, acetoxy, -OG, -C(=O)G, and -CO<sub>2</sub>G, where G is independently selected from the group consisting of: C<sub>1</sub>-C<sub>6</sub> straight alkyl, C<sub>2</sub>-C<sub>6</sub> straight alkenyl, C<sub>1</sub>-C<sub>6</sub> straight alkoyl, C<sub>3</sub>-C<sub>6</sub> branched alkyl, C<sub>3</sub>-C<sub>6</sub> branched alkenyl, C<sub>4</sub>-C<sub>6</sub> branched alkoyl; and if E is aryl, E may be connected by an amide linkage;

e) if R<sub>1</sub> and at least one R<sub>2</sub> group are present, R<sub>1</sub> may be connected by a single or double bond to an R<sub>2</sub> group to form a cycle of 5 to 7 members;

f) if two R<sub>2</sub> groups are present, they may be connected by a single or a double bond to form a cycle of 4 to 7 members; and

g) if R<sub>1</sub> is present and Z<sub>1</sub> or Z<sub>2</sub> is selected from the group consisting of -NHR<sub>2</sub>, -CH<sub>2</sub>R<sub>2</sub> and -NR<sub>2</sub>OH, then R<sub>1</sub> may be connected by a single or double bond to the carbon or nitrogen of either Z<sub>1</sub> or Z<sub>2</sub> to form a cycle of 4 to 7 members.

75. [New] The method of any one of claims 68-70, further comprising co-administering to said subject an effective amount of a skin preserving agent.
76. [New] The method of claim 75, wherein said skin preserving agent is an antioxidant.
77. [New] The method of claim 76, wherein said antioxidant is CoQ<sub>10</sub> or vitamin E.
78. [New] The method of claim 76, wherein the skin preserving agent is an energy-enhancing agent.
79. [New] The method of claim 78, wherein said energy enhancing agent is selected from the group consisting of ATP, nicotinamide and pyruvate.
80. [New] The method of claim 75, wherein said skin preserving agent is a vitamin or a vitamin precursor.
81. [New] The method of claim 80, wherein said vitamin is selected from the group consisting of E, C, B5, B6, and B9.
82. [New] The method of any one of claims 68-70, further comprising the coadministration of a sunscreen or sunblock.
83. [New] The method of claim 82, wherein said sunscreen or sunblock is zinc oxide or titanium dioxide.
84. [New] The method of any one of claims 68-70, further comprising the coadministration of a pharmaceutical carrier suitable for topical administration.
85. [New] The method of any one of claims 68-70, wherein said subject is a human.
86. [New] The method of any one of claims 68-70, wherein said subject is suffering from a skin disorder.

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87. [New] The method of claim 86, wherein said skin disorder is associated with free-radicals, aging, sun radiation, stress or fatigue.

88. [New] The method of claim 86, wherein said skin disorder is skin wrinkles.

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